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Judge how he will treat others. He will pity the wicked without hating them; in his eyes, they will be but mis-made men. But in pardoning the faults of the structure of mind and body, he will none the less admire the beauties and virtues of both. . . . and following the natural law given to all animals, he will not wish to do to others what he would not wish them to do to him.

"Let us then conclude boldly that man is a machine, and that in the whole universe there is but a single substance differently modified. . . . Such is my system, or rather the truth, unless I am much deceived. It is short and simple. Dispute it now who will."

P. C.

THE SPIRIT IN THE WHEELS.

THE MECHANISM OF THE UNIVERSE AS SEEN BY A THEIST.

Dr. James Thompson Bixby has published under the title *The Open Secret* a book which he characterizes as "A Study of Life's Deeper Forces,"¹ and the first problem he attacks is the question of vitality and mechanism. All other problems which he discusses are mere side issues. They are treated in nine more chapters entitled: The Cosmic Motor Power, Atom and Spirit, Purpose in Nature, Law and Providence, Good the Final Goal, Fate or Choice, Our Self-Made World, Partners in World-Making, Search the Deep Things.

Dr. Bixby is a theist; he recognizes the significance of mechanism, but takes his stand on vitalism. He finds the most appropriate allegory for his view in Ezekiel's vision of the winged cherubim, which has been called the "spirit of the living creatures in the wheels." He grants that the mechanics of these wheels is impossible, nevertheless the general idea symbolized by this vision is not merely quite rational but most significant and instructive.

Dr. Bixby continues: "The essential lesson of the vision is that every living creature has around him some revolving machinery, and that within all the mechanical wheel-works which are visible there is a living soul as the motor power and directing agency of the enclosing engine."

Dr. Bixby's book is written from the standpoint of an advanced teleology. The author is sufficiently acquainted with modern science to understand the scientific position and states it in fairness and without animosity; yet he condemns it not only as utterly wrong, but also as chilling our faith and as dangerous.

¹ Published by the American Unitarian Association, Boston, 1912.

We will here state Dr. Bixby's position in his own words without any criticism on our part, referring our readers to our own solution of the same problem presented in the editorial article on mechanicalism.

The Contrast of the Old and New Views.

"To the chanters of the Vedas every flickering flame was a living creature, an appearance of Agni, the fire god; the Greeks beheld in every rustling tree a dryad, in every babbling fountain a water nymph. The prevalent faith of all the early nations, as of savages to-day, was similar. Sun and moon, cloud and storm, evening breeze, each had its impelling divinity. Each spirit followed his own caprice on the impulse of the moment. Nowhere was there any fixed order. With the ascent of thought to the higher faith of monotheism, the only change, for a long time, was that every catastrophe or trouble was interpreted as a retribution sent from the Supreme God upon the sufferer for some known or secret sin. Life was a succession of special providences, and the career of every prophet or saint a series of signs and wonders, manifesting the direct intervention of the Most High.

"Our modern thought, however, has gone to the very opposite extreme. No wind bloweth where it listeth; the wildest gust has its appointed course from which it cannot swerve.

"By uniform laws, every continent has been moulded and uplifted. By simple processes of variation, struggle for existence and accumulation of hereditary gains, the rudimentary creatures have developed into complex and elaborate organisms. In all these diverse species, in all their ingenious organs and vital adjustments, in the rise, growth and decay of nations, and in the most astonishing coincidences of personal or social events, modern science sees only the products of that great machine-shop of interacting, un-resting wheels of law and force that we call nature."

In the New View There is no Room for God.

"The natural result of this extension of the network of law and its mechanical processes over the whole universe is at first most chilling to faith. When the believer who has been brought up in the common conception of the Deity as a vague presence immensely greater than man, but with the personal loves and dislikes, moods of wrath, pity, imperfect counsels, changeable purposes and incomplete forethought which are characteristic of humanity—when such a believer, I say, comes by scientific investiga-

tion to abandon these ideas, what a loss he feels! In what a freezing waste and friendless world he seems to find himself. Having always thought of God as the great intervener and repairer of the cosmic system, manifest in every mystery or eccentricity of the processes of nature, this reduction of the perturbations and irregularities of the world to mechanical laws seems to banish God from the universe. . . . God has seemed to be pushed outside the verge of his own universe and made henceforth a superfluous hypothesis."

The Machinery of Life.

"The very condition of vitality seems to be this constant rotary motion. In man, the blood under the unwearied beat of the heart must course out to the capillaries and brain cells with its fresh supplies of nutriment and energy and must then flow back again to the lungs to become purified and recharged with oxygen. The nerve currents must flow with their sense impressions from the surface up the sensory nerves to the brain and back again in appropriate motor responses to the muscles. In lung, heart, ganglion, blood corpuscle, cell and molecule, there is a constant round. There is continual efflux and influx, consumption and replenishment. It is only by this ceaseless dying and as ceaseless rebirth, that animate beings keep alive.

"And to maintain this circulation of life, what curious and complicated machinery in every part of the body—the valves of the heart, the batteries of the brain, the triangular muscle of the chin, the levers of arm and leg, with their beautiful ball and socket joints, the keyboard of the ear with its three thousand strings, and the hundred other equally ingenious contrivances that make up this moving house of flesh, most of them working so automatically and perfectly that it is only on the occasions that they get out of order that man takes any thought of the complicated mechanisms and delicate adjustments by which he walks and talks and breathes.

"In former days life and mind were fancied to be powers only loosely connected with the grosser flesh into which they were injected. But the investigations of modern physiologists have shown the connection of the vital and mental with their material organs to be of the closest kind. . . .

"Even the mind is dependent on its wheels, its nervous mechanism. Slice off, layer by layer, a pigeon's brains and in the same measure you pare off its power of feeling and of thought. Each of our senses—sight, hearing, smell, language—has its respective

brain-center. Cut out this cerebral seat and the corresponding faculty disappears. . . .

"All these mechanical conditions of life have to be admitted by the candid mind. It is only in the minute and curious detail into which modern research has pushed its probe that there is anything new in this line of facts. The essential truth that a sound mind always depends upon a sound body has been acknowledged for centuries.

"But equally true and equally to be acknowledged is the converse—that for the body's soundness and activity there is needed a healthy and active spirit; it is equally evident that flesh needs soul as much as soul needs flesh.

"The materialist, concentrating his attention solely on the mechanical side of life, of which I have been speaking, would present this as the sum total of vital existence. Animals and men, the lowest star fish and the greatest of poets, (he tells us) are all just so many machines. The food supply determines the egg and the egg produces the bird or bee. As are the respective environments, sense-impressions and links of association, so must be the man's ideas.

"'Without phosphorous no thought,' was the favorite adage of the German man of science, Moleschott. According to naturalistic monism, every act is predetermined by its conditions before it arises. Free choice is a myth, and an idea not generated or conditioned by the physical environment is a chimera. He who is most confident of the dominant power to direct his course is the veriest bit of driftwood in the eddies of inevitable destiny.

"Such are the superficial dicta of the materialists. . . . If it [the body] is an engine, then it is one that contains within an automatic registry of the experience of its ancestors for centuries; and as Prof. J. Arthur Thomson says: 'It is a self-stoking, self-repairing, self-preservative, self-adjusting, self-increasing, self-reproducing engine.'"

Mind Independent of the Machinery.

"Who ever knew a machine to mend its own breaks and replenish its own wastes? It is by this super-mechanical power, ever superintending, remaking and over-ruling the ordinary chemic and physical tendencies that would disintegrate its parts, that every animate organism lives. . . .

"The mind has a power independent of the forces, whether

material or social, pressing upon it, that may properly be called 'the sovereignty of the self in willing.' Behind all the cerebral machinery there hide, as the main spring that moves it, those noble powers by which man is a living soul and a child of God....

"Physical force is a constant quantity. But the moral power of the still small voice draws aid from an inexhaustible source to supply whatever energy it needs to overcome the tide of temptation.

"The limited outer view of things that leads so many to a materialistic solution of the great 'World Riddle' is as superficial as it is depressing."

The Explanations of Materialism Insufficient.

"Candid Christian thought must admit the mediation of these mechanisms and wheels—the wheel of evolution, the wheel of heredity, of struggle for existence, of physical conditions and environment, of unbroken order. But scientific thought, if that also is candid, must recognize the living spirit within the wheels as even more essential....

"The materialist who explains life and thought and all the other thousand wonders of the world as but re-arrangements of an original stock of energy and motion in the primal nebula only accounts for the continuance of the world's activities in some shape or other. This account does not explain the wise and orderly direction and harmony of these activities. To account for that we must have a sufficient wisdom and beneficence in the First Cause....

"That which makes evolution a process of real progress, not a mere swinging round the circle, is the progressive saturation of matter by spirit which it exhibits....

"In the processes of evolution it is the influences from a higher plane that especially accelerate the development of life. How slow was the upward climb of the vegetable kingdom while its progress was carried forward chiefly by the influence of the environment, fortuitous variation and natural selection.... But when the higher forces of animal desire and visual pleasure and esthetic taste came to act upon it, as bee and moth and butterfly became intermediaries in the work of vegetable union and reproduction, what an amazing diversity of form and glory of adornment, and what rapid ascent in complex organization took place!... If the soul of animal and man has done so much in evolution, how much more ought we to credit to the over-soul?

"When the air plant, hung up in a room, gains weight and

substance, we know there must be in the air itself a source of nutrient supply. So when the minds of men grow and burgeon without visible feeding, we know it is by drawing in and assimilating the invisible spiritual nutriment. It is this continuous communion of the finite with the infinite that we call revelation....

"We feel justified in saying that feeling, will and thought will be found behind *all* the physical processes of the world as their cause and essence. It is not because of certain breaks in the chain of causality, certain gaps in the line of development of the animal world, or certain missing links between the brute and man that materialism is unsatisfactory and that physical nature demands a God to supplement its insufficiencies. It is for far profounder reasons: it is because all order implies reason; all change implies force; all force implies will. The great tree of life should ever be thought of as an endogenous organism, growing not from without inward, but from within outward....

"The omniscience of the Infinite One, by its wise provisions, by its skilful, automatic self-adjustments and by the transforming power of the soul's chemistry, provides for the good of all his creatures. Love everywhere hides within these laws. Its pains are but danger signals; its penalties are correctives. This changeless providence, hurting us only when we transgress the divine laws, works ever for greater good. This rigid uniformity and intermediate machinery which we are obliged to master is the means of our education and spiritual development.

"In our personal life and in our interpretation of nature the secret of peace, power and knowledge lies in recognizing these two complementary facts—the outer mechanism and the inner life."

The God Problem.

"What is the *motor power* that has carried the world forward through these countless and constant changes?....

"Matter has no power to move itself. It possesses no spontaneity of action. An essential idea of matter, necessary to all scientific dealing with it, is that of its inertness. If a mass of matter could start itself into motion, or bring itself to a halt, or alter the direction of its motion without the action of something outside of itself, no science of it would be possible."

Arguments Against Theism Answered.

"If the world (as a scientific friend incisively asked me) had a creator, or its organic forms were moulded into their present

shapes and conditions by a reasonable being, would he begin to make a one-toed horse by first making a five-toed creature that climbed trees? To produce a hen, would he start out by making eggs? Or when this creative power wished to make a man, would he, instead of aiming and working directly toward the goal, begin at the bottom of the biologic series by making an ascidian and then change it into a lemurine creature or some other lower animal and then transform that into a simian, and so, by a lengthy circuit, develop the human being, retaining in him numerous survivals of his past which now are apparently quite useless?

"These satiric queries are undoubtedly telling. But do they necessarily compel us to infer absence of purpose, which is the conclusion drawn by Professor Haeckel?

"How is it with a large part of the most rationally planned human work? Does it not accomplish its purpose by decidedly circuitous methods? It is notorious how the iron-moulder begins by making the sand matrix and then breaks it and throws it away. The engineer who builds a stone arch, first puts up the false timber work and then, when he has got his stones in place, pulls down his first wooden structure. Shall we say that the engineer and the iron-moulder have no plan? . . . In our English language how many silent letters are there, of no use whatever except as historic monuments of the former spelling and the course of linguistic development!

"Shall we say therefore that there is no purpose in the work of the tailor and printer and that intelligence has had nothing to do with the evolution of language or costume? Is it not possible that the intelligence that works in nature may have a similar historic or esthetic sentiment? Is it not possible that the divine mind (like human minds) may choose to make circuits provided he can thereby accomplish his ends more easily? . . .

"For my part, I do not see why a theist who maintains that the facts of nature bespeak intelligence in their source is obliged to maintain, also, that nature is as yet a completed work or that the mind, immanent in our part of the cosmos and guiding it, is omniscient.

"While the theist believes in the existence of a supreme being, he may, without inconsistency, suppose that the actual world-building of our solar system may have been delegated to some subordinate divinity, who, though superhuman and wondrously wise and skilful, was not either all-wise or all-powerful. At least, the thinker who

has become an evolutionist will, if he is consistent, never regard that stage and state of nature in which we now live as a finished result beyond which there is to be no more progress."

A Worthy Conception of God.

"For the full satisfaction of the religious instincts, God himself should be recognized as having direct participation in the operations of the world. The spiritual emotions require a present and active God, not an absentee ruler. Our religious intuitions can no more tolerate the idea that the power governing the universe should be blind or subconscious than the reason can tolerate that conception of it that makes it capricious and arbitrary. Only a conscious divine love and life can claim the spirit's loyalty and be recognized by the human soul as sufficiently superior to itself to be worthy of worship. The idea of the world as a titan machine, started and left to itself, is inconsistent with any elevated idea of God....

"Science is daily coming more and more to the conviction that the cosmos is (to use Humboldt's striking phrase) 'a living whole,' an organism everywhere throbbing with vital power and sensibility struggling for its unfolding into breathing, knowing creature forms.The dynamic source of this ceaseless transformation play is a grand energy, more than physical, ever acting, out of an exhaustless life, and from this higher fountain sending down the streams of vitality which circulate through all the veins of the vast, out-spreading cosmos. But energy, according to the testimony of our most eminent philosophers and men of science, we know only as connected with conscious effort, the push or the resistance of the will. Thus at length the vast universe, in all its changing states, its varied phenomena and processes, is found to be a manifestation of personal volition and the action of that guiding mind without which there can be no pressure, effort or direction. As, then, we have to suppose that this guiding mind and energizing will pervade the cosmos wherever energies act, of whom else can they be the attributes than of the One only Infinite—the omnipresent God?"

The Melancholy Teaching of To-Day.

"The older and sterner forms of Christian theology, by their dogmas of predestination and man's natural inability, have been terribly discouraging to human efforts, at least in the moral field.... For many long generations these theological dogmas lay like iron fetters on the mind of man, chaining the will and hardening the

heart. Though in many quarters they still remain, happily they are now fast dissolving beneath the sunlight of modern thought.

'But as these bonds are losing their power, modern science and philosophy are forging new chains, subtler still. From all sides, descend about us the steel wires inscribed: 'Circumstances make the man.' Every act, we are told, is the inevitable outcome of its preceding condition. Every seeming choice is the compulsion of the stronger motive. Free-will is an illusion, exploded now by science. Crime and vice have their averages calculated by the statistician. There were so many hundred murders, so many thousand cases of arson or embezzlement in each of the last ten years. There will be again the same number on the average in the next ten years. Virtue and vice are therefore subject to fixed laws and physical causes, like the return of winter and summer. They are 'merely products of nature,' as Taine says, 'just like sugar and vitriol.'

"The corroding influence of this growing materialism affects all the departments of life. It dissolves the sense of obligation and snatches the crown from virtue to put it on the heads of fact and force....

"Against this reduction of humanity to a helpless victim of circumstances every virile human being ought vigorously to protest. The soul of man is more than its conditions. The human will is the helm of every human course.

"Do not, however, misunderstand me. I do not mean that human volition, even the most resolute, can do anything that it desires. Our will is by no means wholly free. The term 'free will' describes clumsily and inexactly the great truth that it aims to express. The truth would be better described as the mastership of the mind in choosing and willing."

* * *

We will here make one comment only on Mr. Bixby's advanced view of the old conception of teleology. Mr. Bixby is still a dualist. He extols the spirit that resides in the wheels and regards the mechanism of the machinery which the spirit utilizes as something alien to spirit. We believe that both spirit and machine are one, and the universal dominance of the laws of form determining the detailed uniformities of motion, commonly called mechanics, is by no means a depressing or melancholy thought. The laws of form are the very means in which spirit reveals itself. The human mind is a product of these laws and their eternality may very well be conceived as God immanent in the cosmos, as the divinity which

rules its destinies, as the spirit in the wheels. Keep in mind, however, that there are not two things, the spirit and the wheels, but there is one reality. The cosmic order conceived as the norm of all motions is the spirit, and the details of its actualization are the wheels. Every detailed piece of its mechanism is a direct manifestation of the spirit.

HENRI POINCARÉ ON THE RELATIVITY OF SPACE.

Whether or not the theories of Henri Poincaré will live long after him is a question of doubt, but it is certain that his method of presenting mathematical problems is very ingenious and attractive. In his article on "The Relativity of Space" we find him grappling with difficulties which are of his own making. But even though we may disagree we follow him with a real satisfaction at the beauty not only of his style but of his very thought and the method by which he reaches his conclusions.

According to our definition space is relativity itself; space being the scope of motion is the condition of tracing distances, and what is distance but the measurable relation of position? In order to do any measurement in space at all we must start in some definite place and consider it as fixed. It serves us as a point of reference. But if we omit to do this, we become involved in a confusion like that of a dizzy man who cannot clearly mark or maintain the direction of his walk. Yet on the basis of this omission of a definite starting-point of reference, M. Poincaré has succeeded with his traditional consideration of the change of the site of the Pantheon in cosmic space, in producing beautiful kaleidoscopic reflections and cogitations on the relativity of space. It is by the same method that Herbert Spencer in omitting to start his space measurements from a reference point derived the notion of the absolute inscrutability of space.¹

Poincaré's views of space are based ultimately and exclusively on experience, and it seems as if he had forgotten Kant or had never heard of his conception of the *a priori*. We too believe that the idea of mathematical space is derived in its completeness from sense-experience; we believe that only a generalization of a scope of motion, a highly abstract idea of extension with the omission of all particular existences constitutes the basis of space conceptions, and we can construct different kinds of spaces by different modes

¹ See Carus, *Kant and Spencer*, pp. 57-59.